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Radiological Detection and Monitoring Devices in the Healthcare Setting

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We want to know

- Is patient or area contaminated?
- Radiation dose rate in the area.
- Accumulated dose to individuals.

The bigger picture

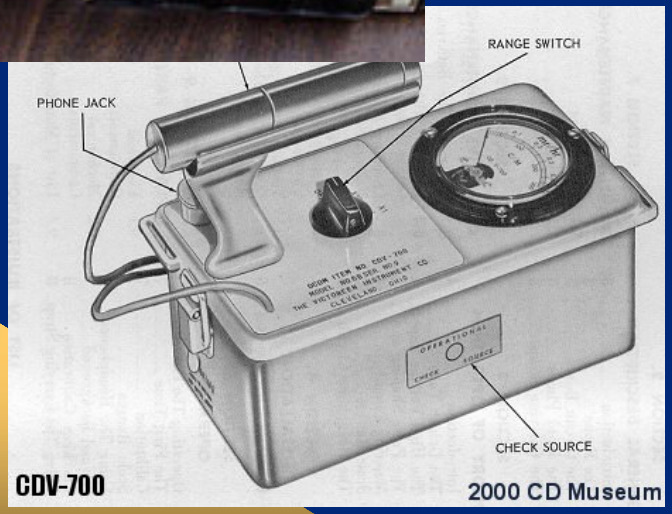
- Radiation measurements merely help to manage the contamination (and simplify cleanup)
- Prompt medical attention should be the first priority

What instruments are available

- Survey meters available in hospital?
- What about the radiology/nuc medicine dept?
- Disaster supplies (i.e., civil defense)
- Do you have a Radiation Safety Officer (RSO) who can provide instruments?

Measuring contamination

- Most common detector is a Geiger-Mueller (GM) Tube.
- Also called a Geiger counter or pancake probe.

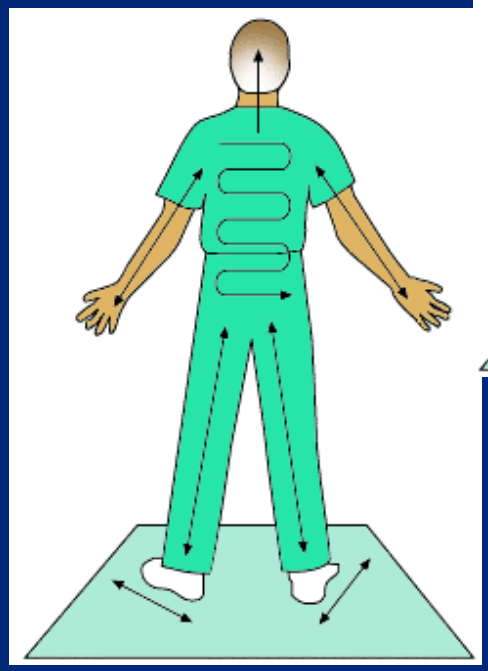


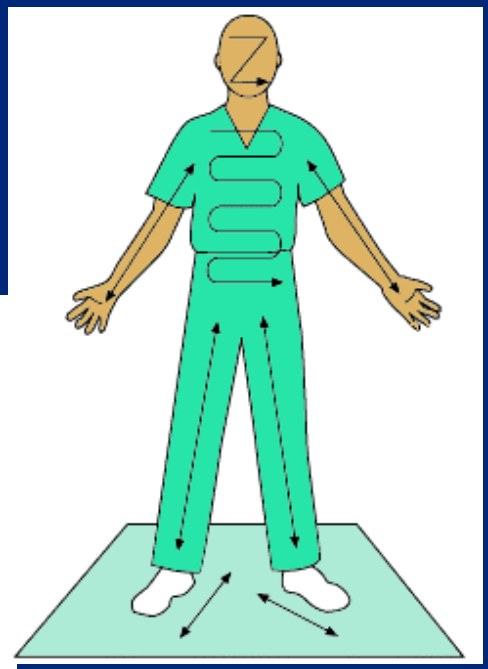
Prepare instrument and measure background

- Put in batteries
- Check batteries using "range" or "bat" function
- Turn audio on
- Move range switch to most sensitive setting.
- Remove probe cover (if any)
- Measure background for 60 sec – write it down.
- Common readings:
  - 40-100 count/min
  - or approx 0.02 mR/hr

Using the instrument

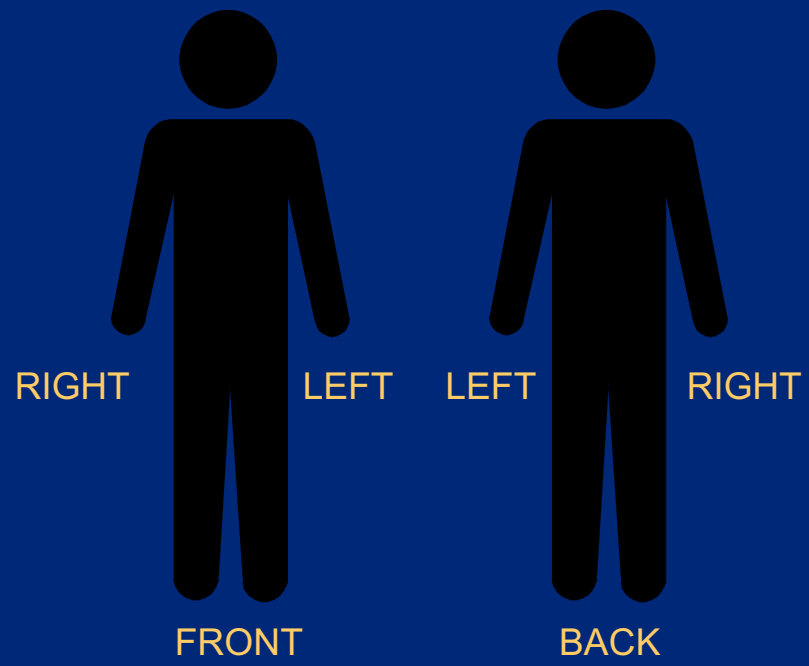
- Begin with most sensitive setting
- Hold probe about 0.5 – 1 inch from the person's skin.
- Move slowly (~1 inch/sec)
- Hands, face, and feet most important





Record results

- Written results needed to compare with measurements taken after decontamination.
- Pre-made body/facility diagrams help
- Especially important with multiple patients
- Record time of survey



Tips for surveying

- Periodically check your own hands/gloves for contamination.
- Avoid direct contact with patient, clothing, or fluids that might contaminate the meter.
- Is audible clicking disturbing patient?

Measuring dose rates

- Measurements of the patient or patient clothing cannot determine what dose (or dose rate) the patient has received.
- Measurements may be used to estimate dose to medical personnel.

Accumulated dose

- Difficult to know without a dosimeter
- Dosimeter types:
  - Pocket Ionization Chamber (immediate)
  - Electronic (EPD)
  - Film badge or TLD (requires processing)

Perspective on dose levels

- Instruments read in Roentgen (R) or rem
- 1 rem ≅ 1 R
- First responder alarming instruments*
  - 10 mrem/hr for initial alarm level
  - 10 rem/hr or 10 rem for "turn back" levels

- Dose rates in hospitals are expected to be much lower (minimal)

*Reference: NCRP Report No. 138

Radiological Detection
- Summary -

- Survey instruments (if avail) can determine if contamination is present.
- Radiation dose rates in area can be estimated using handheld instruments
- Need a dosimeter for accumulated dose.

Obtain expert assistance in interpreting radioactive contamination and dose rate measurements.